TO:	Mr. Carl P. Garvey and Mr. M. Brendan Mullen (Revitalizing Auto Communities Environmental Response Trust) Mr. Alan J. Knauf and Ms. Linda R. Shaw (Knauf Shaw LLP)
FROM:	Katherine Lasseter, Jason Dittman, Jamie Combes, Erin Pyne, and Jill DeMars (TIG Environmental)
SUBJECT:	**DRAFT - Summary Memorandum – Priority Tier Ranking and PCB Aroclor Associations**
DATE:	April 21, 2020

1. Introduction

Revitalizing Auto Communities Environmental Response (RACER) Trust and Knauf Shaw LLP (Knauf Shaw) contacted TIG Environmental[1] to provide consulting services relative to potentially responsible party (PRP) identification and investigation, sampling and data analysis, and expert witness testimony to support RACER Trust and Knauf Shaw during litigation proceedings stemming from a Civil Action No.: 5:18-cv-1267 [DNH/ATB] filed on October 26, 2018 (the Complaint) (RACER 2018).

In the Complaint, RACER Trust, by its attorneys, Knauf Shaw LLP, brings claims for cost recovery and contribution under Sections 107(a) and 113 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 U.S.C. 9607(a) and 9613(f), inter alia, against parties (Defendants) operating in or around the Ley Creek Watershed Site (Study Area) in Onondaga County, New York. The Complaint asserts that the Defendants are responsible to contribute to the cost of past and future investigations to address contamination in and around the Study Area.

RACER Trust requested that TIG Environmental assist in identifying the Defendant sites with the greatest likelihood of polychlorinated biphenyl (PCB) use and discharge to the Ley Creek Watershed in order to support its claims for cost recovery. This memorandum describes TIG Environmental's methodology and results for ranking of the Defendant sites in the Ley Creek Watershed based on analysis of currently available PCB use and discharge evidence. TIG Environmental's analysis methodology consists of a comparative framework approach, which applies to all Defendant sites, based on strength of evidence of PCB use and discharge and the strength of evidence of particular PCB Aroclors associated with each Defendant site.

[1] TIG Environmental is a member of The Intelligence Group, LLC.

Summary Memorandum – Priority Tier Ranking and PCB Aroclor Associations

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TIG Environmental's forthcoming expert report will present the evidence used to develop the comparative framework and the defense for the placement of individual sites into the priority tiers in further detail.

2. Comparative Framework Approach

Through the summer and fall of 2019, TIG Environmental prepared a series of evidence summary memoranda (ESMs) for each Defendant site, summarizing available information regarding PCB use, release, and discharge at each site. Upon review, TIG Environmental identified multiple commonalities among the Defendant sites, as described below.

Certain operations were clearly similar across sites. For example, electrical transformers are almost ubiquitous across sites, and most sites had operations that involved producing or recycling metal components. Operations including metal shearing, pressing, rolling, and bending likely historically involved use of PCB-containing equipment (lifts, presses, furnaces, and compressors), regardless of the end use of the products manufactured at the Defendant sites. It is better to group sites with common operations and compare the strength of evidence between those sites than to compare sites with entirely different operations. The commonality of operations facilitates a more transparent comparison of strength of evidence for PCB use between sites.

Availability of evidence differs based on operating period. For some Defendant sites, PCB-related data are available during and following the site operating period, while little or no relevant data are available for other sites. Absence of representative data should not be used to suggest an absence of PCB contributions to the Ley Creek Watershed. For example, some Defendant sites ceased operations during or before the 1980s, including Prestolite, Super Heat Treating, and Lennox. Consequently, there is little to no sampling for PCBs at these sites. Even for sites with more recent operations, few data are available for the peak period of PCB use.[2] For example, a hypothetical site may have confirmed PCB use in site operations and published monthly stormwater discharge reports with no detections of PCBs. However, if those monitoring reports did not begin until 1995, over a decade after the ban of PCB use,[3] the monitoring data likely does not capture the period of greatest potential PCB use and discharge. These sites with documented use may have contributed PCBs to the Ley Creek Watershed, despite the lack of relevant or applicable onsite sampling data.

The nature of available evidence differs between sites. The fact record for the Ley Creek Watershed is uneven, with varying types and volume of records available for each Defendant site. However, in some

[2] PCB presence in some of the most common uses peaked between the late 1950s and early 1970s (EPA 1976, 163).

[3] On May 31, 1979, the manufacture of PCBs was banned from non-enclosed uses, effective July 2, 1979 (EPA 1979b). Although PCBs were banned for use in 1979, they did not immediately disappear and are still present throughout the environment in trace quantities, as a result of the EPA-authorized five-year phase-out period and the continued use of these banned materials (EPA 1979a). Some non-enclosed sources may have continued to retain old PCB-containing material and enclosed sources such as transformers may have continued beyond 1984 (Erickson and Kaley 2011, 2–3; EPA 1976, 273).

cases, it is possible to draw the same conclusion from different types of information. Consider evidence for three hypothetical sites listed below:

1. Evidence for the first site includes several records of PCB purchases from Monsanto Company (Monsanto)
2. Evidence for the second site includes PCB detections in environmental media surrounding a building known to contain leaking PCB-containing transformers
3. Evidence for the third site includes records of sampling of a stained transformer pad containing PCBs

Although the nature of the record differs, it is reasonable to conclude with the same level of certainty for each site that activities on each of the three sites regularly used PCBs.

Any relative ranking approach for the Defendant sites in the Ley Creek Watershed must consider the commonalities and discrepancies among sites. For example, it would be possible to rank or categorize Defendant sites based on the concentration of PCBs in site media. However, this approach would likely benefit an older site with no sampling data. That theoretical older site would not appear on a list of sites ranked by concentration in site media. Additionally, if concentrations of PCBs in site media were the only ranking criteria, additional compelling lines of evidence suggesting PCB use at that site, such as spill reports or PCB purchase records, would be dismissed. Alternately, a ranking approach that categorized sites solely by volume of confirmed disposal of PCB-containing waste would exclude other sites lacking waste disposal records but confirmed PCB use based on other documentation (sampling data, inventories, or inspection reports).

Therefore, TIG Environmental has developed a comparative ranking framework that places sites into priority tiers. These priority tiers identify the Defendant sites ranked by the amount of evidence of PCB use and discharge. The approach outlined below accounts for the commonality of operations, with consideration of the uneven fact record in terms of amount and type of information available. To arrive at the priority tiers, TIG Environmental' s approach considers all available documentation both from site-specific records and available industry documentation. To arrive at the priority tiers, this comparative ranking approach categorizes sites with a comparable level of evidence regarding PCB use and PCB discharges, as described below:

- Defendant sites with evidence of documented PCB use and detections in site media are ranked higher than sites with evidence of suspected PCB use.
- Defendant sites with detections of PCBs in media along or representative of discharge pathways to the Ley Creek Watershed are ranked higher than sites with suspected discharge pathways.

PCB Use Criteria

The first factor in identifying potential PCB sources that contributed to the Ley Creek Watershed is PCB use. TIG Environmental elected to categorize evidence of PCB use on a source-by-source basis, meaning each Defendant site may have several known or suspected PCB sources. It is reasonable to expect that, at any given site, one or two PCB sources are confirmed, while a few other PCB sources are reasonably suspected to be present based on other evidence, such as waste disposal records, sampling data, or

general industry documentation. Table 1 presents TIG Environmental's compiled PCB use criteria. To establish the degree of certainty that a PCB source or PCB sources exist(ed) at a site, TIG Environmental considers two the following two elements in evaluating the PCB use criteria:

- Evidence of known PCB sources
- Evidence of suspected PCB sources based on typical industry practice of the time period

The strongest possible evidence of PCB use at a site is when more than one PCB-containing source is documented at a site. These sites meet category A as defined in Table 1 for more than one source. As mentioned above, the nature of confirmatory evidence may differ between sites. A range of records, including purchase documents, site inventories, and site inspections, may all serve to confirm that a potential source of PCBs was present. Sampling data further strengthens such evidence.

If sites do not have strong documented evidence as in the case above, they should not be excluded simply based on limited evidence of PCB association. Sources in these circumstances may be categorized as Category B, as defined in Table 1. For example, site records may confirm that a piece of equipment was used onsite (such as a heat transfer system or hydraulic press) but site records may not include evidence discussing the PCB content of fluids used in that equipment. In these cases, TIG Environmental used general industry documentation and sampling data (where available) to establish the PCB association.

For certain Defendant sites, there is limited evidence regarding the nature of operations to determine whether the site operations are associated with PCBs. Sources in these circumstances may be categorized as Category C as defined in Table 1. Often, these sites have early operating periods and thus no sampling data for PCBs in representative media.[4] For these sites, it is reasonable to rely on industry documentation for similar operations. Such potential sources cannot be ruled out because information is limited, but the likelihood of an association is ranked lower than the categories A and B defined in Table 1.

PCB Discharge Criteria

A second factor in identifying potential PCB sources to the Ley Creek Watershed is PCB discharge. Just as the methodology applies PCB use criteria on a source-by-source basis, TIG Environmental applies its PCB discharge criteria on a pathway-by-pathway basis. This method reflects the fact that, at a given site, PCBs may be confirmed along one discharge pathway and inferred along another. Table 2 presents TIG Environmental's compiled PCB discharge criteria. As with the PCB use criteria, TIG Environmental considers the following two elements when establishing the relative likelihood of a viable PCB discharge pathway:

- Strength of evidence of the existence of a documented or potential discharge pathway from the Defendant site to the Ley Creek Watershed
- Strength of evidence of PCB association with the pathway (PCBs detected in site media along a documented or potential discharge pathway)

The strongest evidence of PCB discharge to the Ley Creek Watershed is when PCBs are detected in site media with a hydrological connection (for example, groundwater, surface water, or runoff) to the Ley Creek

[4] This would include circumstances where PCB sampling is in areas distant from the suspected PCB source.

Watershed. Pathways (either former or ongoing) in these circumstances are categorized as Category A, as defined in Table 2. This could include a detection of PCBs in a catch basin known to convey stormwater discharges to the Ley Creek Watershed or a detection in marshland located between the Ley Creek Watershed and a drum storage area known to contain leaking drums. In such circumstances, a PCB discharge pathway is confirmed.

The next category encompasses circumstances where a pathway exists in proximity to a confirmed or suspected PCB source but no representative sampling is available along the discharge pathway. Pathways in these circumstances may be categorized as Category B as defined in Table 2. Consequently, while a likely pathway exists, there is no confirmatory sampling available.

Pathway Category C, as defined in Table 2, applies to circumstances where there is limited evidence to assess the PCB content along a pathway. This includes circumstances where a pathway may exist (for example, stormwater infrastructure is present) but there is no evidence confirming that a PCB source was associated with this pathway due to sparse sampling history, few details about the location of operations at the site, or data gaps in the evidentiary record regarding site features.

For certain Defendant sites, there is limited evidence regarding the nature of discharge pathways to determine whether PCBs could have reached the Ley Creek Watershed from the site. Pathway Category D applies to situations where there is no site-specific evidence regarding the presence or absence of a potential pathway. This would apply to a site where there is no evidence to confirm or refute the presence of site features (for example, catch basins conveying to stormwater) or no information regarding the generation and storage of waste at a site.

3. PCB Priority Tiers

Each site is placed in a PCB priority tier based on the PCB use and discharge categories defined above. Table 3 presents how TIG Environmental combined the PCB use and discharge criteria into criteria for priority tier assignments. The sections below summarize the methodology for identifying priority tier criteria and assigning sites as priority tier for its future evaluation.

Priority Tier Criteria

For determining priority tiers, TIG Environmental classified sites based on the scenario that represents the greatest potential likelihood for PCB release to the Ley Creek Watershed. TIG Environmental considers open sources or semi-enclosed sources (for example, heat transfer systems, lubricating oils, and hydraulic systems) to be sources with the greatest potential for releases to the Ley Creek Watershed. Because transformers are generally considered closed processes, TIG Environmental ranks transformer uses lower than open or semi-enclosed sources. However, where a site is equipped with both an open and enclosed source, the site is categorized based on the open source. For example, a site may feature a transformer with no evidence of a release and no record of PCB detections nearby, but that same site may be associated with storage of PCB-containing waste in an unlined landfill. In this example, the tiering method would prioritize the site based on the landfill, which is the source most likely to result in a release to the Ley Creek Watershed.

As detailed in Table 3, when a site has confirmed or strongly suspected source and a confirmed discharge pathway, the site is assigned to priority tier 1. Subsequent priority tiers reflect progressively less certainty regarding PCB use at the site and discharge from the site to the Ley Creek Watershed. However, for all sites in priority tiers 1 through 3, there is no evidence to conclusively rule out a site's potential PCB contribution to the Ley Creek Watershed.

TIG Environmental recognizes that there are some sites for which there is insufficient evidence to confirm or refute a PCB association and there are some circumstances in which the evidence indicates it is more likely than not that PCBs are absent. The sites in the first group are considered limited evidence sites. TIG Environmental considers a Defendant site to be a limited evidence site where there is reason to suspect a PCB source based on general industry practice but there is insufficient site-specific evidence to assign that site to a priority tier. Should additional evidence become available for these sites, TIG Environmental would evaluate whether to place these sites into a priority tier. TIG Environmental considers a site unlikely to be a PCB source if there is confirmatory evidence that PCBs are absent based on the operating period, sampling records, or other site-specific documentation.

Priority Tier Assignment of Defendant Sites

Table 4 presents the sites for each priority tier and the critical evidence used in TIG Environmental's priority tier assignment. A more thorough presentation of site-specific evidence will accompany TIG Environmental's forthcoming expert report.

The following Defendant sites meet the criteria for priority tier 1:

- Carrier Corporation (Carrier) Site
- Roth Brothers Site
- General Electric (GE) Court Street Plant 5 Site
- New Venture Gear (NVG) Site
- Bristol-Myers Squibb (BMS) Site

These priority tier 1 sites have the strongest evidence of PCB use and discharge. At these sites, PCBs were released during site operations in such a fashion that PCBs reached the Ley Creek Watershed. At least one open or leak-prone PCB source existed on each of these sites, and PCBs are confirmed along at least one discharge pathway to the Ley Creek Watershed. Among all Defendant sites evaluated, these sites are the most likely to have contributed to the observed PCB contamination in the Ley Creek Watershed.

The following two sites meet the criteria for priority tier 2:

- U.S. Hoffman Machinery Company (U.S. Hoffman) Site
- Solvents and Petroleum Site

These priority tier 2 sites have strong evidence of PCB use in site operations but limited evidence of PCB discharge sampling. At these sites, PCB use in site operations is suspected and at least one potential discharge pathway exists. Sampling supports the conclusion that PCBs were released from site operations

but there is no sampling along the discharge pathway. It is possible that, should additional sampling data become available, these sites may later meet the criteria for priority tier 1.

Priority tier 3 sites have confirmed PCB use onsite but there is no sampling for PCBs in site media. These are generally sites with confirmation of PCB presence in a waste manifest record or other record not usually accompanied with sampling in site media. It is possible that, with further investigation, sampling records for a site could be identified that may warrant increasing the site's priority tier.

The limited evidence defendant sites are generally those that are relatively old and/or small. The fact record for these sites is consequently comparatively limited, making it not possible to assign these sites to a priority tier. It is possible that, with additional information, it would be feasible to confirm or rule out a PCB association more conclusively for these sites.

This priority tier approach ranks sites by the strength of evidence available. TIG Environmental recognizes that the tier assignment is, in some respects, as much of a reflection of information availability as it is of actual likelihood of PCB use. For example, although there is strong evidence to suggest PCB use at the Oberdorfer Site based on industry practice, the available sampling record is especially sparse. As presented in Table 4, site operators potentially used PCBs in a range of applications, including die casting, use of foundries, and use of heavy machinery to form and press components. Sampling in the site foundry sand landfills was limited to two samples with an elevated detection limit (80 parts per billion [ppb]) and sampling in stormwater effluent was in a location associated with the nearby Roth Brothers Site. Therefore, the Oberdorfer Site is considered a limited evidence site because of the lack of site-specific evidence to inform a priority tier placement. TIG Environmental would evaluate placing the Oberdorfer Site into a priority tier should additional information become available.

4. PCB Aroclor Association with Defendant Sites

TIG Environmental also identified the specific PCB Aroclors[5] associated with each site's operations, grouped by priority tier, as shown in Table 5. The following are key observations presented in Table 5:

- **Most Defendant sites are associated with several Aroclors:** When incorporating both suspected and documented associations, there is reason to suspect broad PCB use throughout the Ley Creek Watershed.
- **Sampling data for individual PCB Aroclors is sparse:** Where sampling for PCBs is available, it is most commonly available for total PCBs.
- **Certain PCB Aroclors are common among Defendant sites:** PCB Aroclors 1248, 1254, and 1260 were each detected at four of the five sites in priority tier 1 and are frequently associated with the operations at Defendant sites in priority tiers 2 and 3.

[5] Beginning in 1935, Swann Chemical Company, followed by Monsanto, produced commercially available PCB-containing goods in a line of products known as "Aroclors." Each of the 10 common PCB Aroclor mixtures are generally associated with certain signatures of PCB congeners (there are 209 PCB congeners) (Erickson and Kaley 2011, 2–3). The style of reporting analytical data for PCBs varies in reviewed documentation. Results may be reported as individual Aroclors and/or congeners, as a sum of all or some of these analytes, or simply as "PCBs."

From the evaluation presented in Table 5, TIG Environmental concludes that the priority tier 1 defendant sites are the defendant sites with the greatest potential for PCB contributions to the Ley Creek Watershed.

5. Next Steps

This memorandum presents TIG Environmental's most up-to-date categorization of Defendant sites in the Ley Creek Watershed but includes only a summary of the evidence critical to placing each site into the appropriate priority tier (Table 4). Appendix B of the expert report will include a comprehensive presentation of the evidence used to develop Table 4 and the priority tiers. TIG Environmental will submit the five attached tables along with a fully developed discussion of PCB use and discharge as part of its forthcoming expert report. The expert report will evaluate PCB use in industrial activities common in the Study Area, including site-specific evidence regarding PCB use and discharge. The expert report will conclude with the presentation of the same priority tiers and PCB Aroclor associations as presented in this memorandum. Should additional information become available between the drafting of this memorandum and the finalization of the expert report, TIG Environmental may recategorize certain sites in accordance with that new evidence. However, TIG Environmental anticipates that the overall methodology will remain the same.

Tables

Table 1: PCB Use Categories and Criteria

Table 2: PCB Pathway Categories and Criteria

Table 3: PCB Priority Tier Criteria

Table 4: Site to Tier Assignment

Table 5: PCB Aroclor Associations by Site

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Table 1: PCB Use Categories and Criteria

Summary Memorandum – Priority Tier Ranking and PCB Aroclor Associations

Category	Description	Criteria	Hypothetical Example
A	Documented	• Reviewed documents explicitly reference PCBs in association with the given source • Sampling, where available, confirms the presence of PCBs	Site-specific documentation confirms that PCB-containing transformers were used in a power station at the site. Upon decommissioning of the plant, sampling confirms the presence of PCBs, and a waste disposal manifest includes PCB-containing transformer oil. This also includes reports of a confirmed PCB-containing product being purchased (for example, Therminol) but no sampling of PCBs.
B	Suspected based on sampling	• Site-specific documentation confirms the existence of a potential source that general documentation suggests may be associated with PCBs • Sampling in the vicinity of this source contained PCBs	Site-specific documentation confirms the presence of a heat-transfer system but does not explicitly state that PCB-containing heat transfer fluid was used. However, sampling in the building associated with the heat-transfer system detected PCB Aroclors consistent with heat transfer fluid.
C	Suspected based on industry practice; no sampling or insufficient sampling	• Site-specific documentation describes the general nature of operations but does not explicitly reference PCBs • Industry documentation suggests that the given source may be associated with PCBs	Site-specific documentation indicates that the site was used for scrap metal processing. Industry documentation indicates that PCBs may be generated during this process but there is no record of sampling for PCBs, or sampling for PCBs was only collected in non-representative operational areas that are not suspected to be related to PCB use and/or generation (for example, around a fuel tank).

Table 1: PCB Use Categories and Criteria

Summary Memorandum – Priority Tier Ranking and PCB Aroclor Associations

Category	Description	Criteria	Hypothetical Example

		• Sampling for PCBs is either non-existent or insufficient:
		  ○ There is no record of sampling for PCBs
		  ○ PCBs were analyzed for, but in areas not characteristic of PCB-related operations
		  ○ PCBs were analyzed for, but detection limits were high	

Acronyms and Abbreviations

PCB: polychlorinated biphenyl

Table 2: PCB Pathway Categories and Criteria

Summary Memorandum – Priority Tier Ranking and PCB Aroclor Associations

Category	Description	Criteria	Hypothetical Example
A	Documented	• Reviewed documents describe the existence of a site drainage feature or pathway from the site to the Ley Creek Watershed • PCBs were detected in media associated with this pathway	Floor drains were identified in the site's main operations building. For 20 years, the site's operations included used of a heat transfer system that used PCB-containing heat transfer fluid. PCBs were detected in floor drain sampling. These floor drains conveyed untreated drainage directly to Ley Creek via the storm sewer system.
B	Suspected based on confirmed or potential source; no sampling	• Site-specific documentation describes the existence of a site drainage feature or pathway located near a confirmed or suspected PCB source • There is no record of sampling for PCBs in media representative of the pathway	Floor drains were identified in the site's main operations building. For 20 years, the site's operations included used of a heat transfer system that used PCB-containing heat transfer fluid. These floor drains conveyed untreated drainage toward Ley Creek via the storm sewer system but there is no record of sampling in the floor drains or the storm sewer system.
C	Existence of potential pathway; no sampling	• Site-specific documentation describes the existence of a site drainage feature or pathway but there is limited evidence regarding the association with a PCB source • There is no record of sampling for PCBs in media representative of the pathway	A pond at the site received process water from a site building but there is no confirmed or suspected PCB source within that building. Although the pond drained directly to Ley Creek, there is no record of sampling within this feature. Site groundwater flows toward Ley Creek; however, there is no record of sampling.
D	Insufficient information	• There is insufficient information to determine the presence or absence of a pathway	There is no information regarding stormwater infrastructure. It is reasonable to expect that such a pathway exists at most sites, but it was simply not evaluated at the site in question.

Acronyms and Abbreviations

PCB: polychlorinated biphenyl

Table 3: PCB Priority Tier Criteria

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Priority Tier	PCB Use Criteria	PCB Pathway Criteria
1	All of the following are true: **1.** There is evidence confirming open use[1] of PCBs and/or widespread and recurring PCB releases **2.** Site operations included routine use of the equipment or materials associated with PCBs **3.** PCBs have been detected in areas representative of the confirmed source(s)	Both of the following are true: **1.** There is at least one documented pathway from the site to the Ley Creek Watershed **2.** PCBs have been detected in site media representative of at least one of these pathways
2	Both of the following numbered criteria are true: **1.** Either: a. There is evidence confirming PCB use at the site, but in a closed feature such as a transformer with no confirmed release and/or b. There is reason to suspect PCB use and/or inadvertent PCB congener generation[2] based on industry practice **2.** Sampling data exists confirming the presence of PCBs in site media and/or media immediately adjacent to the site, indicating that releases occurred (even if no release was reported)	Both of the following are true: **1.** There is at least one documented pathway from the site to Ley Creek and/or its tributaries **2.** PCBs have been detected in site media, confirming releases of PCBs to site media, but there is no sampling directly along the pathway(s)
3	All of the following criteria are true: **1.** There is evidence confirming PCB use at the site, but in a closed feature with no confirmed releases (such as a transformer) **2.** There is reason to suspect further PCB use and/or inadvertent PCB congener generation based on industry practice **3.** There is no record of sampling for PCBs in site media to confirm or refute PCB association with site operations or to confirm whether a release occurred	Both of the following are true: **1.** There is at least one potential pathway from the site to the Ley Creek Watershed **2.** There is no record of sampling for PCBs in site media to confirm or refute PCB discharges along the potential pathway(s).

Table 3: PCB Priority Tier Criteria

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Priority Tier	PCB Use Criteria	PCB Pathway Criteria
Limited evidence sites	For these sites, there is reason to suspect PCB use and/or inadvertent PCB congener generation based on industry practice. However, there is insufficient site-specific sampling or other site-specific record to confirm or refute a PCB association with site operations. There is at least one potential pathway from the site to Ley Creek and/or its tributaries. However, considering the unconfirmed nature of PCB use at these sites, there is insufficient evidence of a PCB release along the potential pathway(s).	
Unlikely to be a PCB Source	There is insufficient evidence to suspect PCB use at the site, and there is no record of sampling for PCBs in site media. Consequently, there is no evidence that a PCB pathway would exist.	

Notes

[1] Examples of open use would include PCB use in the form of cutting oils, where the fluid is not contained within something like a hydraulic line or a transformer.

[2] PCB congeners are inadvertently generated through several industrial processes, including waste incineration, power generation, scrap metal recycling, investment casting and the generation of foundry sands (Aries, Anderson, and Fisher 2008, 3; Wuet al. 2014, 1; Dungan, Huwe, and Chaney 2009).

Acronyms and Abbreviations

PCB: polychlorinated biphenyl

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

This table presents a summary of the site-specific evidence critical to support placing each site in a given priority tier, adhering to the criteria presented in Table 3. Table 3 presents the specific criteria for each tier used to prioritize the sites in this table. This table is not an exhaustive list of all evidence, rather the information with the most direct link to the criteria.

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
Priority Tier 1			
Carrier Corporation (Carrier) 1940–1997	**1.** Carrier manufactured HVAC units at this site. Carrier's manufacturing process likely involved cutting, pressing, shearing, rolling, spinning, and bending metal pieces to meet the specifications of the desired fabricated metal products.[i] Carrier purchased large volumes of PCB-containing heat transfer fluid, indicating that PCBs were certainly present in equipment used to support site operations.[ii] Carrier stored as many as 42 transformers inside a single building (building TR-1), with 31,500 gallons of PCB-containing transformer oil documented onsite.[iii] The transformers inside buildings at the site leaked to surrounding areas, as evidenced by a detection of 310,000 ppm total PCBs in wood block flooring surrounding a transformer pad in building TR-1.[iv] **2.** Carrier removed over 6,000 tons of PCB-containing waste from the Site, as documented in waste disposal manifests since 1983 and the present.[v] **3.** In addition to the PCB detections surrounding the transformers, PCBs have been detected in several process areas. In building TR-1, PCBs were detected in crane grease, with PCB Aroclors 1254 and 1260 at concentrations up to 13.4 ppm and 90.3 ppm, respectively.[vi] In building TR-3, use of lubricating oil baths may explain the detections of PCBs in groundwater, storm sewer infrastructure, soil, and LNAPL beneath the footprint of the former building.[vii] These detections in process areas provide strong evidence of PCB use in site operations.	**1.** There are three documented pathways for contamination from the Carrier Site to reach Ley Creek: stormwater and overland flow. **2.** PCBs were detected in site media associated with the three pathways. **Stormwater:** Carrier's operations at the site resulted in extensive releases to the site's stormwater system. In 2012, total PCBs were detected at a concentration of 61.6 ppm in sediment samples collected from a storm line pipe, east of the transformer yard. PCB Aroclor 1260 was detected in the bedding material of this storm line at a concentration of 56,900 ppb.[viii] To address this, in 2011, Carrier installed a system for treating PCB-contaminated stormwater.[ix] Given that the stormwater lines were installed at the site in the early 1940s, stormwater represented a likely pathway for PCBs for approximately 60 years.[x] **Overland flow:** PCBs were detected in waste disposal areas with no evidence of containment, presenting an opportunity for contaminated media to reach Sanders Creek and South Branch Ley Creek via overland flow. A wetland area exists between a landfill at the site and Sanders Creek. In 2014, Carrier reported total PCBs in concentrations up to 17.5 ppm in sediments collected between an onsite landfill and wetland area toward Sanders Creek.[xi] This detection indicates that an overland flow pathway likely existed at the site. **Groundwater:** PCB Aroclors 1221, 1242, 1248, 1254, and 1260 were detected in site groundwater with a maximum detected total PCB concentration of 450 ppb. Based on potentiometric surface maps of the site, groundwater at the site flows to the northwest, toward Sanders Creek, and to the southwest towards South Branch Ley Creek in the landfill area.[xii]	i (EPA 1995, 25; Knauf Shaw 2019, Carrier Site Dossier, 1; ENSAFE 2010a, FOIL057408 at FOIL057414; NYSDEC 2006, FOIL040459 at FOIL040482) ii (Monsanto 1982, 5; Erickson and Kaley 2011, 5; Monsanto 1975, 32) iii (Onondaga DOH 1971, FOIL266540 at FOIL266608–610; Carrier 1981, FOIL266630 at FOIL266698–700; ENSAFE 2010a, FOIL057408 at FOIL057415) iv (ENSAFE 2010a, FOIL057408 at FOIL057415–417) v (Knauf Shaw 2019, Carrier Dossier Exhibit F, 1–20) vi (United Technologies 2010, FOIL267285 at FOIL267290; ENSAFE 2009, FOIL074764 at FOIL074766; Knauf Shaw 2019, Carrier Dossier Exhibit A, 2) vii (United Technologies 2010, FOIL267285 at FOIL267290; AECOM 2017, FOIL056011 at FOIL056016, 535; ENSAFE 2015, FOIL052328 at FOIL052335; ENSAFE 2013, FOIL057721 at FOIL057726; ENSAFE 2013, FOIL240856 at FOIL057726; ENSAFE 2014c, FOIL231328 at FOIL231374, 376; NYSDEC 2004, FOIL070629 at FOIL070631; NYSDEC Division of Water 2009, FOIL267541 at FOIL267541) viii (ENSAFE 2013, FOIL045515 at FOIL045521, 537, 539) ix (ENSAFE 2009a, FOIL220710 at FOIL220720; AECOM 2016c, FOIL062477 at FOIL062484) x (ENSAFE 2012, FOIL240808 at FOIL240818) xi (AECOM 2015, FOIL053528 at FOIL053642) xii (ENSAFE 2013, FOIL075706 at FOIL085822, 831; ENSAFE 2014b, FOIL085796 at FOIL075749, 752; ENSAFE 2014c, FOIL231328 at FOIL051561; ENSAFE 2015, FOIL052328 at FOIL052360; ENSAFE 2014a, FOIL051541 at FOIL051561; ENSAFE 2010b, at FOIL048205; AECOM 2015, FOIL053528 at FOIL053662)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
Roth Brothers 1949–present	**1.** Operations at the Roth Brothers Site included scrap metal recycling processes, such as processing aluminum twitch (a byproduct of metal scrapping processes) and incinerating copper wire insulation.[i] Total PCB congener detections in a catch basin that received stormwater from the scrap storage yard confirm that PCBs released from site operations.[ii] PCB use at the site is further evidenced by the presence of transformers (up to 18 oil-filled transformers at one time) and PCB concentrations up to 0.588 ppm in soil samples collected near the transformers.[iii] **2.** Roth Brothers generated PCB-containing baghouse dust containing up to 5,000 ppm PCBs at the site. NYSDEC cited Roth Brothers on at least one occasion for improperly storing the baghouse dust beyond the permitted length of time at the site.[iv] The citation for improper storage suggests that such PCB-containing waste was generated regularly and on an ongoing basis. **3.** PCBs are present in site media that is representative of scrap metal processing operations. The highest reported PCB concentrations in soil (204 ppm) were detected in samples collected from the dumping area (with no evidence of containment), the portion of the site closest to South Branch Ley Creek.[v] Total PCB congeners were detected at concentrations up to 39.2 ppb in a catch basin receiving stormwater from the scrap yard.[vi]	**1.** There are two documented pathways for contamination from the Roth Brothers Site to reach Ley Creek: stormwater and groundwater. **2.** PCBs were detected in site media associated with both pathways. **Stormwater:** Roth Brothers exceeded its stormwater permit limits for total PCBs on several occasions. Specifically, PCBs were detected in stormwater discharges between 1991 and 1997, and between 2016 and 2019, with concentrations of PCB Aroclor 1242 up to 12 ppb and Aroclor 1248 up to 19 ppb between the available sampling events.[viii] PCBs were detected in site stormwater discharging toward South Branch Ley Creek, requiring Roth Brothers to implement a PCB minimization plan in 2016.[vii] **Groundwater:** Groundwater at the Roth Bros. Site contained Aroclor 1254 at concentrations up to 35 ppb in June 2018.[ix] The location of the site suggests that groundwater in this vicinity would likely flow toward South Branch Ley Creek.	i (TAMS 1994, FOIL207154 at FOIL207168; AT Kearny 1991, FOIL204759 at FOIL204775, 789, 809) ii (B&L 2018d, FOIL277467 at FOIL277467) iii (H&A of New York 1991b, FOIL204207 at FOIL204212–213, 237; B&L 2009, FOIL277134 at FOIL277161–162) iv (TAMS 1994, FOIL207154 at FOIL207161) v (TAMS 1996, FOIL207287 at FOIL207306, 317) vi (B&L 2018d, FOIL277467 at FOIL277472) vii (B&L 2018e, FOIL213165 at FOIL213165) viii (NYSDEC 1991c, FOIL211989 at FOIL211990; NYSDEC 1988a, FOIL203735 at FOIL203735; TAMS 1994, FOIL207154 at FOIL207162, 163; Knauf Shaw 2019, Roth Brothers Site Dossier, 1, 5, 6, 25, 37, 41, 45, 47, 81; Roth Bros. Smelting 1998, FOIL276620 at FOIL276625) ix (B&L 2014, FOIL209537 at FOIL209542, 601; B&L 2018c, FOIL210077 at FOIL210082, 111)
General Electric (GE) Court Street Plant 5 1956–1991	**1.** GE manufactured radar and sonar equipment, printed circuit boards, and other electrical equipment.[i] Monsanto records indicate that GE purchased approximately 25,190 lb of PCB Aroclor 1254 and Aroclor 1260 products that were delivered to nearby GE facilities between 1970 and 1975. PCBs are generally associated with electrical equipment, including voltage regulators, switches, electromagnets, and capacitors.[ii] To support electronics manufacturing operations, GE stored PCB-containing transformers at four locations on the site.[iii] Detections of PCBs in site media adjacent to the transformers and photographs of stained transformer pads suggest that multiple releases of PCBs occurred in relation to GE's use of the transformers at the site.[iv] **2.** It is reasonable to conclude that GE used PCBs during its manufacturing operations at the site.[v] Given that PCBs are associated with the principal products (electrical equipment) that GE manufactured at the site, it is likely that these operations resulted in routine use of PCBs.[vi]	**1.** There are three documented pathways for contamination from the GE Court Street Site to reach Ley Creek: stormwater, overland flow, and groundwater. **2.** PCBs were detected in site media associated with the three pathways. **Stormwater:** One of the principal process areas at the GE Court Street Plant 5 Site contained approximately 14 floor drains, which potentially conveyed discharges to the storm sewer.[ix] PCBs were detected at a concentration of 45.5 ppm in a sediment sample collected from one of the floor drains in the process areas.[x] This constitutes a likely discharge pathway from the site to Ley Creek via stormwater. **Overland Flow:** The site is located adjacent to Ley Creek. PCB Aroclor 1260 was detected in soil adjacent to a drain outlet at a concentration of 27.4 ppm. This outlet discharged from a transformer pad directly to soil at the site.[xi] Further, photographs show that outdoor transformer pads at the site were stained.[xii] Stormwater potentially contacting these contaminated soils could have migrated to Ley Creek via overland flow.	i (BBL and Lockheed 1996, FOIL001446 at FOIL001450) ii (Monsanto 1972, 194; Monsanto 1982, 38, 176, 191; EPA 2019a; EPA 1976, 27–28, 43, 54) iii (BBL and Lockheed 1996, FOIL001446 at FOIL001451) iv (EMCON 1998, FOIL001622 at FOIL001632; BBL and Lockheed 1996, FOIL001446 at FOIL001459, 494; NYSDEC 1998, FOIL000300 at FOIL000331; GE 1997, FOIL000849 at FOIL000849–850) v (BBL and Lockheed 1996, FOIL001446 at FOIL001458, 492, 494, 502–503) vi (EPA 2019a; EPA 1976, 27–28, 43, 54; BBL and Lockheed 1996, FOIL001446 at FOIL001450) vii (EMCON 1998, FOIL001622 at FOIL001632) viii (BBL and Lockheed 1996, FOIL001446 at FOIL001458, 492, 494) ix (BBL and Lockheed 1996, FOIL001446 at FOIL001458, 492, 494, 502–503)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
	3. In 1995, PCBs (specifically Aroclor 1260) were detected in a soil sample collected from adjacent to the drain outlet for the transformer pad west of building 5A at a concentration of 27.4 ppm.[vii] In addition, PCBs were detected at concentrations of 45.5 ppm in sediments in a drainage sump inside building 5A.[viii]	**Groundwater:** At the site, groundwater flows northwest toward Sanders Creek and Ley Creek. PCB Aroclor 1260 was detected at concentrations up to 370 ppb in groundwater during a 1997 transformer removal event.[xiii]	xi (GE 1997, FOIL000849 at FOIL000849–850) xi (EMCON 1998, FOIL001622 at FOIL001632) xii (BBL and Lockheed 1996, FOIL001446 at FOIL001458, 492, 494, 502–503) xiii (EMCON 1998, FOIL001622 at FOIL001646; Lockheed 1998, FOIL000446 at FOIL000499)
New Venture Gear (NVG) 1959–2012	**1.** NVG manufactured automobile transmissions and transaxles at the NVG Site. Such operations typically involve machining and casting of aluminum, cast iron, and steel.[i] An understanding of these operations generally suggests that it is reasonable to expect that these operations involved the use of PCB-containing equipment and fluids. Reviewed documents confirm that NVG operated a heat exchange system to support these processes.[ii] PCBs were detected in two retention ponds at the site that received cooling water discharged from the heat exchange system.[iii] Smaller-scale uses of PCBs onsite are suspected with the use of casting wax and transformers based on industry practice. **2.** Site operators disposed of PCB-containing transformers, transformer and/or capacitor oil, PCB-containing liquids (other than transformer oil), and other PCB-containing equipment generated at the site.[iv] Generation and disposal of PCB-containing wastes in this volume confirms PCB use at the NVG Site. **3.** PCBs were detected at least twice in areas representative of site processes. Effluent containing PCB Aroclor 1260 at a concentration of 0.12 ppb, including industrial process wastewater, discharged at outfall 001.[v] The stormwater retention pond, which received heat exchange system cooling water, contained sediments with a maximum total PCB concentration of 4.2 ppm.[vi]	**1.** There is one documented pathway for contamination from the NVG Site to reach Ley Creek: stormwater. **2.** PCBs were detected in site media associated with the stormwater pathway. The lower retention pond received discharges from the heat exchange system at the site, a likely source of PCBs, and outfall 001 conveyed retention pond overflow to Ley Creek.[vii] PCB Aroclors 1248, 1254, and 1260 were detected in stormwater retention pond sediments at concentrations up to 1.5 ppm, 1.6 ppm, and 1.3 ppm, respectively.[ix] The detections in the stormwater infrastructure presents a documented discharge pathway via stormwater.	i (Knauf Shaw 2019, New Venture Gear Site Dossier, 4) ii (Chrysler 1974, FOIL196035 at FOIL196038) iii (OBG 2013a, FOIL196603 at FOIL196605; Chrysler 1985, FOIL196046 at FOIL196063) iv (Knauf Shaw 2019, New Venture Gear Dossier, 4; Knauf Shaw 2019, New Venture Gear Site Exhibit B, 1–3) v (OBG 2009, FOIL196543 at FOIL196543) vi (OBG 2013a, FOIL196603 at FOIL196605; Knauf Shaw 2019, New Venture Gear Dossier Exhibit F, 9–10) vii (Chrysler 1974, FOIL196035 at FOIL196036–037; New Process Gear 2012, FOIL064295 at FOIL064295) viii (OBG 2013a, FOIL196603 at FOIL196605; Knauf Shaw 2019, New Venture Gear Site Exhibit G, 8–10)
Bristol Myers Squibb (BMS) Ca. 1943–present	**1.** The BMS Site was a large-scale pharmaceutical manufacturing facility, with a portion of the site historically used as a foundry.[i] Large-scale PCB use is confirmed with the disposal of large quantities of PCB-containing waste. In total, BMS disposed of about 935,000 lb of solid PCB-containing waste and 5,000 gallons of liquid PCB-containing waste.[ii] Approximately 70 percent of this volume is accounted for by soil excavation on the portion of the property that was used as a scrap metal processing facility.[iii] The remaining 30 percent, approximately 300,000 lbs, may be explained by operations in the pharmaceutical process, including the use of transformers and a heat transfer system.[iv] The waste disposal records confirm use, handling, and/or generation of PCBs in site operations.	**1.** PCBs were detected in sediments in South Branch Ley Creek and Headson's Brook near the site, with concentrations up to 1.5 ppm.[vii] These detections suggest the presence of a pathway for PCBs. While the specific mechanism is unknown, two pathways exist for contamination from the BMS site to reach Ley Creek: direct discharges and stormwater. **2.** While there is no sampling in the pathways themselves, the detections in the adjoining sediment suggest one of the following pathways is a possible mechanism for the observed contamination. **Direct Discharges:** Spills and/or contaminated discharges are documented as early as 1967 to Headson's Brook through stormwater outfalls that discharge directly to the storm sewer system. These include	i (OBG 2013b, FOIL034697 at FOIL034764–766; Knauf Shaw 2019, Bristol Myers Exhibit H, 15; Duranceau and Spangenberger 2011, 5) ii (Knauf Shaw 2019, Bristol Myers Exhibit B, 1–3; NYSDEC 2019, FOIL247206 at FOIL247206; Arcadis 2016b, FOIL096401 at FOIL096416, 490, 917) iii (Knauf Shaw 2019, Bristol Myers Exhibit H, 15, 380–473) iv (Knauf Shaw 2019, Bristol Myers Exhibit B, 2; Monsanto 1975, 5; Monsanto 1982, 5; BMS 2018, FOIL033852 at FOIL033852) v (OBG 2013b, FOIL034697 at FOIL034764–766) vi (Knauf Shaw 2019, Bristol Myers Exhibit H, 17, 29)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
	2. The site included approximately 100 buildings, with processes including laboratories, fermentation and extraction, chemical storage, and electrical supply.[v] It is reasonable to expect that such extensive and large-scale processes required routine use of equipment related to electrical systems maintenance and heat transfer, which are associated with PCBs. **3.** Twelve distinct areas of the scrap metal processing at the BMS Site contained total PCB concentrations over 25 ppm and were consequently excavated in approximately 1996.[vi] There is no record of sampling around Bristol Myers' heat exchange system.	at least 33 instances of spills up to 5,000 gallons discharged directly into waterways.[viii] **Stormwater:** The site was equipped with at least nine outfalls and there is one report of an unpermitted "consistent dry weather flow" via stormwater outfalls 003 and 009 discharging from the site toward Headson's Brook and South Branch Ley Creek, respectively. However, the origin of this flow is unknown.[ix]	vii (Arcadis 2016b, FOIL096401 at FOIL096457; Knauf Shaw 2019, Bristol Myers Exhibit D) viii (Knauf Shaw 2019, Bristol Myers Exhibit B, 35; Knauf Shaw 2019, Bristol Myers Exhibit K, 39-41, 67; OBG 2013b, FOIL034697 at FOIL034716) ix (NYSDEC 2018a, FOIL263983; Knauf Shaw 2019, Bristol Myers Exhibit J, 13; Arcadis 2016b, FOIL096401 at FOIL096457)
Priority Tier 2			
U.S. Hoffman Machinery Company (U.S. Hoffman) 1905–present	**1.** The U.S. Hoffman Site meets both Priority Tier 2 criteria regarding PCB use: a. U.S. Hoffman used at least one transformer at the site, which released transformer oil on at least two occasions.[i] U.S. Hoffman disposed of PCB-containing oil, establishing a likely link between PCBs and transformers onsite.[ii] b. U.S. Hoffman operated a foundry to manufacture ball bearings and ammunition shells during World War II[iii]. Little is known about the specific nature of foundry and metalworking operations at the Site beyond the existence of one spray booth (likely for spray painting) and the generation of paint waste.[iv] Foundries and metalworking facilities are typically associated with PCBs in several ways, including the use of heavy machinery (presses, shears, and lifts) and associated equipment and fluids; use of casting waxes; use of certain industrial paints and lacquers; and use of transformers to power electric furnaces or other large-scale electrical equipment. **2.** PCB Aroclors 1248 and 1254 were identified onsite in the vicinity of a diesel AST.[v] These PCB Aroclors are associated with the use of transformers and hydraulic oils, consistent with the U.S. Hoffman's operations at the site.[vi]	**1.** There is one suspected pathway for contamination from the US Hoffman Site to reach Ley Creek: overland flow. The U.S. Hoffman Site is located in close proximity to South Branch Ley Creek.[vii] **2.** U.S. Hoffman's operations released PCBs from transformers to the ground surface at least twice.[viii] Stormwater potentially contacting these PCB-contaminated site soils could have migrated to South Branch Ley Creek via overland flow. During a 2015 onsite spill cleanup effort, unknown "surface drainage features" transported site soil containing detections of PCB Aroclors 1248 and 1254 approximately 300 ft east, toward South Branch Ley Creek.[ix]	i (Knauf Shaw 2019, U.S. Hoffman Site Exhibit A, 11–13; Knauf Shaw 2019, U.S. Hoffman Site Exhibit C, 1, 4) ii (Knauf Shaw 2019, U.S. Hoffman Exhibit D, 1; NYSDEC 1997a, 1) iii (James n.d., 1; Heritage Research Center 2019, 11; Knauf Shaw 2019, U.S. Hoffman Site Dossier, 1) iv (Knauf Shaw 2019, U.S. Hoffman Site Exhibit B; NYSDEC 2000, FOIL255656 at FOIL255680, 682, 750, 759) v (Knauf Shaw 2019, U.S. Hoffman Site Exhibit C, 68) vi (ATSDR 2000, 494; Erickson and Kaley 2011, 10) vii (ArcGIS 2019a) viii (Knauf Shaw 2019, U.S. Hoffman Site Exhibit A, 11–13; Knauf Shaw 2019, U.S. Hoffman Site Exhibit C, 1, 4) ix (Knauf Shaw 2019, U.S. Hoffman Site Exhibit C, 6, 11)
Solvents and Petroleum 1977–present	**1.** The Solvents and Petroleum Site meets Priority Tier 2 criteria (b) regarding PCB use: a. The Solvents and Petroleum Site handled materials generated by third parties in PCB-associated industries (printing, metal machining, electrical equipment manufacturing).[i] PCBs are associated with such material. Waste manifests indicate that Solvents and Petroleum disposed of over 2,200 kg of PCB-containing waste.[ii] The nature of the waste and association with site operations is unknown.	**1.** The site is located adjacent to Ley Creek and sediment and soil samples collected from Ley Creek adjacent to the Solvents and Petroleum Site contained detectable concentrations of PCB Aroclors 1016, 1242, 1248, 1257, and 1260.[iv] Thus, it is reasonable to conclude that a potential overland flow pathway for PCBs exists. **2.** There is no record of sampling site media. Because of the presence of another possible source, the former Salina Landfill north of the site, and the absence of upland sampling, a potential contribution from the Solvents and Petroleum Site to Ley Creek is unconfirmed.[v]	i (NYSDEC 2012, FOIL199847 at FOIL199902; Erickson and Kaley 2011, 10–12) ii (Knauf Shaw 2019, Solvents and Petroleum Site Dossier, 1–3) iii (Knauf Shaw 2019, Solvents and Petroleum Exhibit B, 7, 21) iv (Knauf Shaw 2019, Solvents and Petroleum Exhibit B, 10, 18, 26; EPA 2014, 16, 63, 70–72) v (Knauf Shaw 2019, Solvents and Petroleum Exhibit B, 7, 21)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
	2. There is no record of sampling for PCBs in site media; however, PCBs were detected in Ley Creek immediately adjacent to the Solvents and Petroleum Site.[iii]		
Priority Tier 3			
National Grid South 1920s–present	**1.** The National Grid South Site is an electrical substation equipped with several PCB-containing transformers.[i] Oil beneath the transformers and staining surrounding the transformer pads suggests that transformers have leaked at the site.[ii] PCB Aroclors 1260 and 1242 were detected in transformer oil within other site transformers.[iii] **2.** Other equipment associated with electrical infrastructure is documented onsite including an oil house, and other electrical support infrastructure.[iv] The nature of the oil and other electrical equipment is unknown, but such infrastructure may be associated with PCBs. **3.** There is no sampling in media in the substation area. However, samples in a ditch and a wetland area between the substation and Ley Creek contained concentrations of PCBs up to 370 ppm and 14,000 ppm, respectively.[v] Considering that releases are documented and PCBs were detected in materials handled at the site consistent with what was released, it is reasonable to conclude that National Grid contributed to the observed PCB contamination in the wetland area.	**1.** There is one suspected pathway for contamination from the National Grid South Site to reach Ley Creek: overland flow. The Site is located immediately adjacent to Ley Creek. The reported equipment failures and releases indicate a potential overland flow pathway.[vi] There is no documentation describing any drainage infrastructure in the substation. **2.** PCBs were detected at concentrations of 370 ppm in media associated with a drainage ditch and up to 14,000 ppm in media associated with the wetland area at the northern part of the site, which is also part of Operable Unit 2 of the IFG site.[vi] Sampling in the wetland presents the possibility of a discharge pathway via overland flow. However, there is no sampling between the substation and the wetland area to better delineate potential contributions from the National Grid South Site against contributions from sources on the IFG site.	i (Knauf Shaw 2019, National Grid Teall Substation Site Dossier 2019, 1; NYSDEC 2018b, FOIL063044 at FOIL063045; LSL 2014, FOIL063056 at FOIL063057) ii (National Grid n.d., FOIL063052 at FOIL063052–055) iii (NYSDEC 2018b, FOIL063044 at FOIL063045; LSL 2014, FOIL063056 at FOIL063057) iv (Grid 2014, FOIL063064 at FOIL063066, 112) v (NYSDEC and EPA 2015, 18–19) vi (Knauf Shaw 2019, National Grid Teall Substation Site Dossier 2019, 1; NYSDEC 2018b, FOIL063044 at FOIL063045; LSL 2014, FOIL063056 at FOIL063057; National Grid n.d., FOIL063052 at FOIL063052–055)
Carlyle 1960–present	**1.** Carlyle used transformers at the Carlyle Site to facilitate the production of reciprocating compressors.[i] Carlyle disposed of PCB-containing transformers and PCB-containing transformer oil.[ii] Carlyle operations resulted in the release of PCB-containing materials at the site on two documented occasions, in 1988 and 1993.[iii] **2.** Compressors like those manufactured at the Carlyle Site are commonly associated with PCB-containing materials, such as dielectric fluids, lubricants, and hydraulic oils.[iv] Hydraulic and cutting fluids potentially containing PCBs were likely used to support the metalworking processes involved in manufacturing compressors.[v] Carlyle also disposed of non-transformer PCB-containing waste, including capacitors.[vi] **3.** Sampling at the Carlyle Site aimed to characterize VOC contamination. Sampling focused on areas associated with solvent storage and/or high VOC concentrations.[vii] In the limited samples collected and analyzed for PCBs, PCBs were not detected. However, it is reasonable to conclude that potential source areas for PCBs have not been adequately characterized at the Carlyle Site.	**1.** There are two pathways for contamination to migrated from the Carlyle Site to Ley Creek: direct discharge (spills) and groundwater flow. The Carlyle Site is located immediately adjacent to Sanders Creek, a tributary of Ley Creek.[viii] **2.** Although PCBs were not detected in site media, the site has not been adequately characterized for PCB contamination.	i (Knauf Shaw 2019, Carlyle Site Dossier, 2–3) ii (Knauf Shaw 2019, Carlyle Site Exhibit D, 1) iii (Carlyle 1993, 1–4; Knauf Shaw 2019, Carlyle Site Exhibit B, 1) iv (DEQ 2003, 3–4; Erickson and Kaley 2011, 2, 5, 7–10) v (EPA 1995, 25, 35; EPA 1976, 43; Erickson and Kaley 2011, 5, 9) vi (Knauf Shaw 2019, Carlyle Site Exhibit D, 1; Carlyle 1991) vii (NYSDEC 1999a, FOIL264179 at FOIL264197,199–200, 293, 392, 437) viii (Knauf Shaw 2019, Carlyle Site Dossier, 1–2)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
Syracuse China Corporation (Syracuse China) 1921–2009	**1.** Syracuse China used PCB-containing transformers at the Syracuse China Site. Although the total number of transformers is unknown, Syracuse China removed approximately 16,000 lbs of PCB-containing transformers (greater than 500 ppm) during its operations at the site.[i] **2.** According to a review of industry practices, chinaware manufacturing operations can be associated with the use of heavy machinery and heavy machinery use can be associated with the use of PCB-containing hydraulic fluids.[ii] Syracuse China's manufacturing operations included clay glazing, which could have relied on PCB-containing paints and lacquers during finishing operations. **3.** Although PCB use is suspected based on industry practice, site media samples are not available to confirm the presence of PCBs in site operations.	**1.** There are three potential pathways for PCBs generated onsite to migrate to Ley Creek: direct discharges, overland flow, and groundwater. **2.** There is no sampling of site media to confirm or refute Syracuse China's contribution to these pathways. **Direct Discharges:** Syracuse China discharged wastewater from plant processes to Ley Creek via outfall 001 by way of the settling ponds on the eastern portion of the site, confirming a documented direct discharge pathway.[iii] Additionally, in the settling pond area, groundwater elevation is near the surface, facilitating infiltration into the ponds and discharge to Ley Creek through outfall 001. **Overland flow:** Runoff from the landfill area ultimately drains to Ley Creek.[iv] **Groundwater:** Groundwater at the site flows north to Ley Creek, confirming a potential groundwater pathway.[v]	i (Knauf Shaw 2019, Syracuse China Exhibit F, 1; Syracuse China 1995, FOIL261209 at FOIL261213, 214) ii (EPA 1995, 25, 35–36, 81; EPA 2004, 68) iii (Knauf Shaw 2019, Syracuse China Exhibit K, 2; Knauf Shaw 2019, Syracuse China Site Dossier, 4; Syracuse China 1992, FOIL066492 at FOIL064528) iv (Knauf Shaw 2019, Syracuse China Exhibit E, 11). v (Knauf Shaw 2019, Syracuse China Exhibit K, 4)
Western Electric Company, Inc. (Western Electric) 1952–present	**1.** As documented in waste materials, Western Electric generated and sent 4,500 lb of non-transformer PCB-containing waste for disposal offsite. Such waste may have been generated in the course of telephone equipment repair.[i] Further, Western Electric stored PCB-containing transformers at the Western Electric Site.[ii] **2.** Western Electric handled cables at the site to support telephone equipment repair. Such cables are generally associated with PCBs.[iii] It is possible that unconfirmed additional sources of PCBs exist at the Western Electric Site. **3.** There is no record of sampling for PCBs in site media.	**1.** There is no record of the presence or absence of site drainage features, and the site is not located immediately adjacent to Ley Creek. There is no record of how waste was generated, handled, or stored at the site to confirm or refute pathways. However, groundwater at the site likely flowed toward Ley Creek.[iv] **2.** There is no record of sampling of site media to confirm or refute Western Electric's contribution to these pathways.	i (Knauf Shaw 2019, Western Electric Exhibit C, 1; Knauf Shaw 2019, Western Electric Site Dossier, 1; Telesector Resources Group 1993; Knauf Shaw 2019, Western Electric Exhibit A1, 11, 27) ii (Knauf Shaw 2019, Exhibit A1, 10–11, 31; Knauf Shaw 2019, Western Electric Site Dossier, 4) iii (Knauf Shaw 2019, Western Electric Exhibit C, 1; Knauf Shaw 2019, Western Electric Site Dossier, 1, 3; Telesector Resources Group 1993) iv (Knauf Shaw 2019, Western Electric Site Dossier, 4; ArcGIS 2019a)
GE East Molloy 1986–2017	**1.** In 1990, EPA listed the GE East Molloy Site as a PCB handling facility.[i] Several transactions of PCB-containing waste are confirmed onsite, including transformer and/or capacitor oil and "other miscellaneous PCB wastes."[ii] **2.** At the site, GE repaired and maintained electrical equipment, which is a potential source of PCBs.[iii] It is possible that GE handled other PCB-containing material in the course of these operations. **3.** There is no record of sampling for PCBs in site media.	**1.** The site is located approximately 105 ft to 175 ft west of Ley Creek, presenting a potential overland flow pathway.[iv] **2.** There is no record of sampling in onsite media to confirm or refute the GE East Molloy Site's contribution to this pathway.	i (Knauf Shaw 2019, GE Syracuse E Molloy Site Dossier Exhibit A, 29; EPA 2019d, 4) ii (Knauf Shaw 2019, GE Syracuse E Molloy Site Dossier Exhibit A 46, 53–54, 102) iii (ABB n.d.a; ABB n.d.b; ABB 2018, 1; EPA 2019b, 2; EPA 2019c, 2) iv (ArcGIS 2019a)
Prestolite 1910–1986	**1.** In October 1988, a citizen reported that six or seven 55-gallon drums, some labeled "PCBs," had been abandoned in the Prestolite Site's parking area.[i] Prestolite operated at least one transformer and, later in its operations, an electrical power station.[ii]	**1.** There are two suspected pathways for contamination from the Prestolite Site to reach Ley Creek: overland flow and stormwater. In 1985, a drainage ditch along the western boundary of the facility received both storm and roof drainage.[v] Based on the location of	i (Knauf Shaw 1988, Prestolite Site Exhibit C, 1) ii (Knauf Shaw 2019, Prestolite Site Exhibit B, 2, 5; Google Earth 2019d)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
	2. Prestolite manufactured the following at the site: spark plugs and automotive electrical equipment, fractional horsepower motors and traction motors, small generators, small electric appliances (specifically clocks and can openers), electric windshield wipers, and large motors for use in golf carts.[iii] PCBs were associated with a range of small electrical components, specifically in the use of welding equipment, small electrical components, or other pieces of heavy machinery. Prestolite may have employed such equipment. Smaller-scale uses of PCBs onsite are suspected with the use of casting wax. **3.** In 1986, PCB Aroclor 1254 was detected at a concentration of 2.9 ppb in sediments from site wastewater treatment tanks that discharged to the municipal sanitary sewer.[iv] Although this detection confirms PCB use or production at the Prestolite Site, it does not represent a detection along a documented pathway from the site.	this ditch as illustrated in site plans, the direction of the ditch was toward Teall Brook. However, this ditch is not apparent on aerial photographs available at this time. **2.** There is no record of sampling of site media to confirm or refute Prestolite's contribution to these pathways.	iii (Knauf Shaw 2019, Knauf Shaw Prestolite Site Exhibit D, 1; Knauf Shaw 2019, Prestolite Site Dossier, 2) iv (NYSDEC n.d., FOIL276162 at FOIL276416, 202) v (NYSDEC n.d., FOIL276162 at FOIL276230, 407)
Limited Evidence Sites			
Oberdorfer Foundries (Oberdorfer) 1921–2013	Oberdorfer operated a foundry that cast metal components of engines and small centrifugal pumps. Specific operations include die casting, sand molding, core fabrication, metal melting and pouring, and metal cleaning and machining.[i] Waxes used in investment casting and other casting mold processes (such as die casting, sand molding, and core fabrication) are associated with decachlorobiphenyls (DecaCB). Further, the main foundry building was equipped with a transformer room.[ii] However, sampling in surrounding soil for PCB Aroclors did not contain concentrations above the 1 ppm detection limit.[iii] Only two samples were collected from onsite landfills used to dispose of waste foundry sands, where PCBs could reasonably be expected to be present, with a relatively elevated detection limit (80 ppb).[iv] Given the limited number of samples and elevated detection limits, there is insufficient evidence to confirm or refute a PCB association with site operations. There are three potential pathways from the site to Ley Creek: direct discharge, overland flow, and groundwater. Oberdorfer discharged cooling water and process water via three outfalls (001, 003, and 004) to South Branch Ley Creek.[v] Additionally, the surface of the inactive landfill slopes toward Ley Creek, presenting an overland flow pathway.[vi] When Oberdorfer collected a liquid sample from a discharge point on the southern portion of the site that was potentially representative of runoff from the spent foundry sands disposal area, it contained 0.27 ppb of PCB Aroclor 1248. However, subsequent investigations indicated that the discharge could have also originated from the neighboring Roth Brothers Site, indicating that this sample is not conclusively representative of the pathway from the Oberdorfer site.[vii] Groundwater at the site flows toward South Branch Ley Creek, and phenolitic resins from the side landfill were detected in the groundwater, suggesting a relationship between contamination in the landfill and groundwater, though there is no record of sampling for PCBs in groundwater at the site.[viii] Therefore, there is no sampling representative of pathways confidently associated with the Oberdorfer Site.		i (Wolf 1974, FOIL248845 at FOIL248867; Hayes 2013, FOIL248839 at FOIL248839; Wolf 2006, FOIL247916 at FOIL247924; Knauf Shaw 2019, Oberdorfer Site Dossier, 1) ii (Knauf Shaw 2019, Oberdorfer Site Exhibit B) iii (Wolf 1984, FOIL249001 at FOIL249003–005, 010) iv (Knauf Shaw 2019, Oberdorfer Site Exhibit H, 9–10, 97–101, 121–133, 136–143; Dungan, Huwe, and Chaney 2009, 1–4; NYSDEC 1991a, FOIL249473 at FOIL249474, 483, 488) v (Wolf 1974, FOIL248845 at FOIL248860–861) vi (Knauf Shaw 2019, Oberdorfer Site Exhibit A, 17) (Knauf Shaw 2019, Oberdorfer Site Exhibit A, 17) (Knauf Shaw 2019, Oberdorfer Site Exhibit A, 17) vii (Wolf 1993, FOIL249073 at FOIL249074) viii (Knauf Shaw 2019, Oberdorfer Exhibit A, 20–21, 36, 65)
Lennox Industries, Inc. (Lennox) ca. 1935–1967	Lennox manufactured residential furnaces at the site, which included the operation of a foundry and metalworking facility.[i] Few details exist regarding the specific nature of PCB use in site operations. However, foundries and metalworking facilities are generally associated with the presence of furnaces, heavy machinery, transformers, and paints and lacquers. Therefore, it is reasonable to expect that site operations were associated with PCBs. Further, at least one transformer of unknown PCB content is documented onsite.[ii] However, there is no record of sampling for PCBs in site media to confirm or refute an association. There is limited evidence regarding the nature of pathways at this site. The topography of the Lennox Site suggests that runoff would flow north to Teall Brook.[iii] However, there is no information regarding the presence or absence of site drainage features and there is no record of sampling of site media to confirm or refute Lennox's contributions to a particular discharge pathway.		i (Knauf Shaw 2019, Lennox Exhibit B, 4) ii (Knauf Shaw 2019, Lennox Exhibit B, 1) iii (USGS 1957, 1)

Table 4: Site to Tier Assignment

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site[1]	PCB Use Criteria	PCB Pathway Criteria	References
Lamson Corporation (Lamson) ca. 1922–1932 to2000	Lamson operated a brass foundry, plated metal components, coated metal parts with lacquers, and fabricated steel.[i] Transformers were present onsite; however, the PCB content of these transformers is unknown. Few specific details about the nature of the foundry operations at the site are available in reviewed documents. Even though there is no record of sampling in site media, it is reasonable to expect that PCBs would be associated with the use of paints and lacquers, transformers, furnaces, and other electrical equipment.[ii] There is no information regarding the presence or absence of site drainage features and there is no record of sampling of site media to confirm or refute Lamson's contributions to a particular discharge pathway.		i (Knauf Shaw 2019, Lamson Site Dossier Exhibit B, 1–5) ii (Knauf Shaw 2019, Lamson Site Dossier Exhibit B, 1–5)
Super Heat Treating 1953–1988	Super Heat Treating treated and tested specialty metal components.[i] Few details are available regarding the specific nature of raw materials and equipment handled at the Super Heat Treating Site; however, it is likely that site operations included use of a heat-treating furnace. Transformers containing PCBs were historically common at facilities using electric furnaces. Therefore, it is reasonable to expect the presence of transformers or other PCB-containing electrical equipment. However, there is no record of sampling for PCBs in site media. There is no information regarding the presence or absence of site drainage features and there is no record of sampling of site media to confirm or refute Super Heat Treating's contributions to a particular discharge pathway.		i (Syracuse Herald-Journal 1967)
Unlikely to be a PCB Source			
National Grid North (ca. 1995–2003 to present)	Aerial photographs indicate that the National Grid North Site is a small electrical substation that was constructed sometime between 1995 and 2003.[i] National Grid began phasing out all of its PCB-containing transformers and capacitors within its distribution area in 1986, claiming in 2013 that no PCB-containing transformers or capacitors were still in operation.[ii] Considering that the site was developed after National Grid phased out PCBs from site operations, there is a limited potential association with PCBs.		i (Google Earth 2019a; Google Earth 2019b; Google Earth 2019c) ii (National Grid 2013, 4)

Notes

[1] The concentrations included in this table are presented in consistent units (ppm for soil, sediment, and sludge; ppb for groundwater, effluent, and leachate). For some sites, this required conversion from the original reported units presented in the source documents.

Acronyms and Abbreviations

AST: above-ground storage tank
IFG: Inland Fisher Guide
NYSDEC: New York State Department of Environmental Conservation
PCB: polychlorinated biphenyl
ppb: parts per billion
ppm: parts per million
VOC: volatile organic carbon

Table 5: Aroclor Associations by Site

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

This table summarizes the suspected and detected PCB Aroclor and congener content on each Defendant site. A given PCB compound is reported as "detected" if it was detected in environmental media (such as soil, catch basin sediments, and stormwater). If a PCB compound is confirmed in site operations through a purchase record but has not been detected in site media, that compound is considered evidence of a suspected association. This table does not attempt to evaluate the degree of sampling sufficiency between Defendant sites, whether with respect to number of samples or detection limit. However, TIG Environmental recognizes that some sites have more available data than others.

Site	Aroclor									Total PCBs[1]	Other PCB Blends[2]	Inadvertent PCBs[3]
	1016	1221	1232	1242	1248	1254	1260	1262	1268			
RACER Site												
GM-Inland Fisher Guide (GM-IFG) [4]	D		ND		D	D	D					
Priority Tier 1												
Carrier Corporation (Carrier)[5]	ND	D	ND	D	D	D	D			D		
Roth Brothers[6]	D			D	D	D	D			D		
General Electric (GE) Court Street Plant 5[7]	ND	ND	ND	ND	ND	ND	D					
New Venture Gear (NVG)[8]					D	D	D			D		
Bristol-Myers Squibb (BMS)[9]				D	D	D	D			D		
Priority Tier 2												
U.S. Hoffman Machinery Company (U.S. Hoffman)[10]	ND	ND	ND	ND	D	D	ND	ND	ND			
Solvents and Petroleum[11]	D-OS			D-OS	D-OS	D-OS	D-OS					

	Suspected onsite because of industry practice or contained within equipment
D	Detected in environmental media within site boundaries
D-OS	Detected in offsite environmental media adjacent to the site
	Sampled for but not detected in environmental media

Table 5: Aroclor Associations by Site

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Site	Aroclor									Total PCBs[1]	Other PCB Blends[2]	Inadvertent PCBs[3]
	1016	1221	1232	1242	1248	1254	1260	1262	1268			
Priority Tier 3												
National Grid South[12]										D		
Carlyle[13]	ND	ND	ND	ND	ND	ND	ND					
Syracuse China Corporation (Syracuse China)[14]	ND	ND	ND	ND	ND	ND	ND			ND		
Western Electric Company, Inc. (Western Electric)[15]												
GE East Molloy[16]												
Prestolite[17]						D						
Limited Evidence Sites												
Oberdorfer Foundries (Oberdorfer)[18]	ND	ND	ND	ND	D-OS	ND	ND			ND		
Lennox Industries (Lennox)[19]												
Lamson Corporation (Lamson)[20]												
Super Heat Treating[21]												
Unlikely to be a PCB Source												
National Grid North												

	Suspected onsite because of industry practice or contained within equipment
D	Detected in environmental media within site boundaries
D-OS	Detected in offsite environmental media adjacent to the site
	Sampled for but not detected in environmental media

Table 5: Aroclor Associations by Site

Summary Memorandum – Priority Tier Ranking and Aroclor Associations

Notes

[1] Total PCBs (unspecified Aroclors). An entry appears in this column if there is at least one sampling event that reports results as total PCBs without specifying the nature of the PCB Aroclors.

[2] This refers to non-Aroclor products produced by manufacturers other than Monsanto (for example, decaCB) or custom PCB products with unique PCB Aroclor blends (for example, Pydraul).

[3] This refers to inadvertent PCB congener generation. PCB congeners may be generated during certain thermal processes and found as byproducts in certain pigments (Jianget al. 2015, 5; Hu and Hornbuckle 2009, 1).

[4] IFG Site notes- Citations for the detections in site media are: (TIG 2019, 7). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 7–11).

[5] Carrier Site notes - Citations for the detections in site media are: (AECOM 2015, FOIL053528 at FOIL053549, 555, 586–602, 642; ENSAFE 2009, FOIL074764 at FOIL074768, 770–778; ENSAFE 2013, FOIL075706 at FOIL075749–752; ENSAFE 2015, FOIL052328 at FOIL052360). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 7–11; EPA 1995, 25; EPA 2004, 68). The Carrier Site is well characterized for PCBs. As discussed in further detail in the expert report, dozens of investigations sampled for PCBs in site groundwater, stormwater, surface water, soil, creek sediments, catch basin sediments, and demolition debris throughout the site. Analysis for PCBs was the purpose of many of these investigations. The characterization of PCBs at the Carrier Site is comprehensive.

[6] Roth Brothers Site notes - Citations for the detections in site media are: (H&A of New York 1991b, FOIL204207 at FOIL204224–225, 226; NYSDEC 1988b, FOIL200839 at FOIL207162, 163; TAMS 1994, FOIL207154 at FOIL162, 163; B&L 2014, FOIL209537 at FOIL209542, 602; B&L 2018c, FOIL210077 at FOIL210082, 111; EPA 1988, FOIL276558 at FOIL276570). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 10; Knauf Shaw 2019; AT Kearny 1991, FOIL204759 at FOIL204775; Jiang et al. 2015, 6; B&L 2018b, 1). PCBs were analyzed for in approximately 25 soil samples across the site, with one sample collected immediately adjacent to the former transformer pad. In addition, 12 groundwater samples, eight groundwater monitoring wells, and 13 samples from catch basins in the stormwater drainage system have been collected and analyzed for PCBs (H&A of New York 1991b, FOIL204207 at FOIL204224–225, 246, 280; TAMS 1994, FOIL207154 at FOIL207162, 163; NYSDEC 1988b, FOIL200839 at FOIL200840; B&L 2014, FOIL209537 at FOIL209540–542). The site is relatively well characterized for PCBs.

[7] GE Court Street Plant 5 detection notes - Citations for the detections in site media are: (EMCON 1998, FOIL001622 at FOIL001632; NYSDEC 1998, FOIL000300 at FOIL000337, 340; Lockheed 1998, FOIL000446 at FOIL000499). Citations for evidence to suspect PCBs in site operations are: (Monsanto 1972, 194; Monsanto 1982, 38, 176, 191; BBL and Lockheed 1996, FOIL001446 at FOIL001451–452; Erickson and Kaley 2011, 5, 9–10, 12–13). The analysis presented for this site reported one of the analytes as PCB “Aroclor 1016/1242.” Accordingly, an ND is given for both of these PCB Aroclors due to the uncertainty in the analysis. The detection limit for soil investigations at the site was 20 mg/kg, a relatively elevated detection limit (NYSDEC 1998, FOIL000300 at FOIL000337). This means that PCBs may have been present in samples up to 20 mg/kg without being reported. The detection limit of 20 mg/kg is between NYSDEC criteria for Brownfield Cleanup Sites (1 ppm in surface soil, and 10 ppm in subsurface soil) and its cleanup goal for industrial sites (25 ppm) (Grannis 2010, 12–13). Three samples of transformer oil and five wipe samples of concrete pads, about 10 soil samples, and two groundwater samples were also analyzed for PCBs (EMCON 1998, FOIL001622 at FOIL01632–163, ; NYSDEC 1998, FOIL000300 at FOIL00334–355). Given the low sampling density and elevated detection limits, it is likely that the nature and extent of PCB contamination at the Site has not been well characterized.

[8] NVG Site notes - Citations for the detections in site media are: (OBG 2009, FOIL196543 at FOIL196543–559; OBG 2013a, FOIL196603 at FOIL196604–605; Knauf Shaw 2019, New Venture Gear Site Exhibit G at pp. 1–3, 8–10). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011; EPA 1995, 25, 35–36, 81; EPA 2004, 68). Sampling for PCBs at the site is limited. Only three samples were collected in sediments from onsite stormwater settling ponds and 13 samples were collected from wastewater for PCBs (OBG 2013a, FOIL196603 at FOIL196603–604; OBG 2009, FOIL196543 at FOIL196544). There is no record of sampling in site soil. Therefore, it is possible that the extent of PCB contamination at the site has not been well characterized.

[9] BMS Site notes - Citations for the detections in site media are:(Arcadis 2016b, FOIL096401 at FOIL096436, 457, 502, 505, 508, 511, 514, 843, 849, 855, 861, 866, 867, 873, 951; Knauf Shaw 2019, Bristol Myers Exhibit H, 71–300) Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 10–14; Syracuse Herald Journal 1945, FOIL077505; OBG 2018, FOIL007505 at FOIL007513, 535; Knauf Shaw 2019, Bristol Myers Site Dossier, 1; Aries, Anderson, and Fisher 2008, 3; Wuet al. 2014, 1–2; Dyke 1998, 15, 20–23, 27). The BMS Site is well characterized for PCBs. As discussed in further detail in the expert report, there have been several investigations for PCBs in site groundwater, stormwater, soil, and creek sediments throughout the site. Analysis for PCBs was the purpose of many of these investigations. The characterization of PCBs at the Bristol Myers Site is comprehensive.

[10] U.S. Hoffman Site notes - Citations for the detections in site media are: (Knauf Shaw 2019, 68). Citations for evidence to suspect PCBs in site operations are: (Knauf Shaw 2019, 11–13; Knauf Shaw 2019, 4; Erickson and Kaley 2011, 5, 9–10, 12–13; NYSDEC 2000, FOIL255656 at FOIL255685, 755–756, 769, 784, 789; EPA 1976, 27; City of Spokane 2015, 2; EPA 1977, 55; Hu and Hornbuckle 2009, 2). The detection limits for these PCB analyses were up to 11 µg/kg, with a reporting limit up to 78.8 µg/kg (Knauf Shaw 2019, US Hoffman Site Dossier Exhibit, 68). This means that detections below 11 ppb would not be reported and that concentrations below 80 ppb would be estimated. These detection and reporting limits are below NYSDEC cleanup goals for Brownfield Cleanup Sites (1 ppm in surface soil, and 10 ppm in subsurface soil) and industrial sites (25 ppm) (Grannis 2010, 12–13). However, concentrations below this value would still be informative in a forensic evaluation. Further, there are only two soil samples available for the site (Knauf Shaw 2019, US Hoffman Site Dossier Exhibit, 68–69) . Therefore, the nature and extent of PCB contamination at the Site has not been well characterized.

[11] Solvents and Petroleum Site notes - Citations for the detections in site media are: (Knauf Shaw 2019, Solvents and Petroleum Exhibit B, 18, 26). Citations for evidence to suspect PCBs in site operations are: (Knauf Shaw 2019, Solvents and Petroleum Site Dossier, 1–2 ; EPA 2010, 2). No soil samples are available within site boundaries, and only three samples are available for sediments adjacent to the site. Further, the available sediment samples were collected from a location also reasonably attributable to an offsite landfill (Knauf Shaw 2019, Solvents and Petroleum Exhibit B, 18, 26). In the absence of further sampling, the contribution of PCBs (in terms of both nature and extent) from the Solvents and Petroleum Site is unconfirmed.

[12] National Grid South Site notes - Citations for the detections in site media are: (NYSDEC and EPA 2015, 18–19; NYSDEC 2018b, FOIL063044 at FOIL063045; LSL 2014, FOIL063056 at FOIL063057). Citations for evidence to suspect PCBs in site operations are: (NYSDEC 2018b, FOIL063044 at FOIL063066, 112; Erickson and Kaley 2011, 5, 9–10). The only available samples analyzed for PCBs at the site are of transformer oil (NYSDEC 2018b, FOIL063044 at FOIL063045; LSL 2014, FOIL063056 at FOIL063056–063). Therefore, although the Aroclor content of the transformers at the Site has been characterized, the extent of PCB contamination in site media has not been characterized.

[13] Carlyle Site notes - Citations for the detections in site media are: (NYSDEC 1999a, FOIL264179 at FOIL264437, 445). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 5, 9). The detection limits for this sampling event were relatively low, up to 2 µg/L in groundwater and up to 49 µg/kg in soil (NYSDEC 1999a, FOIL264179 at FOIL264437, 445). Nine samples are available in site groundwater from four monitoring wells and five soil samples from three sampling locations (NYSDEC 1999a, FOIL264179 at FOIL264437, 445). Although the detection limits are relatively low, the amount of locations sampled is insufficient to characterize the nature and extent of PCB contamination at the Carlyle Site.

[14] Syracuse China Site notes - Citations for the detections in site media are: (Geraghty & Miller 1995, FOIL283831 at FOIL283864, 903). Citations for evidence to suspect PCBs in site operations are: (Syracuse China 1995, FOIL261209 at FOIL261213–214; Knauf Shaw 2019, RACER0056394 at RACER0056394; Vardhan 2004, 23; Erickson and Kaley 2011, 5, 9–10). For several of the sampling events, the detection limits range from 33 µg/kg to 67 µg/kg (Geraghty & Miller 1995, FOIL283831 at FOIL283904). These detection limits are below DEC cleanup goals for Brownfield Cleanup Sites (1 ppm in surface soil, and 10 ppm in subsurface soil) and industrial sites (25 ppm) (Grannis 2010, 12–13). However, concentrations below this value would still be informative in a forensic evaluation. Further, only two samples are available for PCBs, and these samples were collected from a berm associated with the wetland area between the rail tracks and Ley Creek, not in the vicinity of process areas (Geraghty & Miller 1995, FOIL283831 at FOIL283864, 903, 929–931). As a result, process areas and potential discharge pathways have not been adequately characterized for PCBs at the Syracuse China Site.

[15] Western Electric Site notes - Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 1, 7–10; Western Electric 1964, 59; NJANG 2017, 8, 10–11).

[16] GE East Molloy Site notes - Citations for evidence to suspect PCBs in site operations are: (ABB 2018, 1; Erickson and Kaley 2011, 5, 9–10 ; ABB n.d.a; ABB n.d.b).

[17] Prestolite Site notes - Citations for the detections in site media are: (NYSDEC n.d., FOIL276162 at FOIL276416). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 7, 10–11; DHHS 2000, 494; EPA 1976, 27; City of Spokane 2015, 2; EPA 1977, 55).

[18] Oberdorfer Site notes - Citations for the detections in site media are: (NYSDEC 1991a, FOIL249473 at FOIL249474, 483, 489; Wolf 1993, FOIL249073 at FOIL249074). Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 10; EPA 1976, 27; City of Spokane 2015, 2; EPA 1977, 55; Associates 1977, at FOIL249235; EPA 2017; Consulting n.d., FOIL247812 at FOIL247812). Only two samples area available at the site: one each in old and new landfill areas. Each PCB Aroclor had a detection of 80 ppb (NYSDEC 1991a, FOIL249473 at FOIL249474, 483, 488). This sampling is insufficient to characterize the extent of site operations.

[19] Lennox Site notes - Citations for evidence to suspect PCBs in site operations are: (Knauf Shaw 2019, Knauf Shaw Lennox Exhibit B, 1–4; EPA 1995, 25, 35–36, 81; EPA 2004, 68; Hu and Hornbuckle 2009, 2; McGuire 1996, 29; USDOT 1984, 25; Erickson and Kaley 2011, 2).

[20] Lamson Site notes - Citations for evidence to suspect PCBs in site operations are: (Knauf Shaw 2019, Lamson Site Dossier Exhibit B, 1–5; DEQ 2003, 4; EPA 1976, 24, 27, 163, 229; City of Spokane 2015, 4; Erickson and Kaley 2011, 1–2,10–13; EPA 1977, 55).

[21] Super Heat Treating Site notes - Citations for evidence to suspect PCBs in site operations are: (Erickson and Kaley 2011, 10; McGuire 1996, 31; Jiang et al. 2015, 6).

Acronyms and Abbreviations

PCB: polychlorinated biphenyls
ND: not detected
NYSDEC: New York State Department of Environmental Conservation